

Slow Solar Wind Pressure Pulses and Their Geoeffectiveness on the Dayside Aurora

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All the slow solar wind pressure pulses in 1997 have been studied. These events are the ones with peak pressure greater than 10 nPa and mainly caused by the gradual increase of the solar wind plasma density. We found that the dayside auroral brightening is increased gradually when the solar wind dynamic pressure increases slowly. Most of the auroral brightenings are asymmetric flank auroras. Four types of the dayside energy transfer mechanisms have been proposed: 1) betatron acceleration of preexisting plasma followed by electron and proton loss cone instabilities, i.e., growth of plasma waves and scattering of particles into the loss cone; 2) creation of near-ionospheric potential drops and direct particle energization; 3) Kelvin-Helmholtz instability and 4) particle diffusions.